

CHEMISTRY OF COSMETOLOGY

COURSE DESCRIPTION

This course, which is the advanced level of cosmetology, prepares students to perform work-related services using chemicals in the cosmetology industry. Content provides students the opportunity to acquire foundation skills in both theory and practical applications. Laboratory facilities and experiences will be used to simulate cosmetology work experiences. Upon completion and acquisition of 1500 hours, students are eligible to take the Tennessee State Board of Cosmetology examination for a Tennessee Cosmetology License. Upon completion and acquisition of 600 hours, students are eligible to take the Tennessee State Board of Cosmetology Manicuring examination for a Tennessee Manicuring License.

Pre-requisite: Principles of Cosmetology and Design Principles of Cosmetology

Recommended Credits: 2-3

Recommended Grade Levels: 12th

Note (1): Learning expectations to be completed for two credits are identified with two asterisks (**), and those to be completed for three credits are identified with three asterisks (***)

CHEMISTRY OF COSMETOLOGY

- 1.0 Students will interpret and demonstrate the basic principles of safety, sterilization, and sanitation as it relates to chemical services performed in cosmetology.
- 2.0 Students will analyze procedures for cleansing and reconditioning the hair and the scalp.
- 3.0 Students will create harmony using design principles and elements.
- 4.0 Students will evaluate hands and feet for cosmetic procedures.
- 5.0 Students will formulate cosmetic procedures and applications to enhance a client's appearance.
- 6.0 Students will evaluate basic actions of chemicals as they relate to the cosmetology industry.
- 7.0 Students will demonstrate leadership, citizenship, and teamwork skills required for success in the school, community, and workplace.

CHEMISTRY OF COSMETOLOGY

STANDARD 1.0

Students will interpret and demonstrate the basic principles of safety, sterilization and sanitation as it relates to chemical services performed in cosmetology.

LEARNING EXPECTATIONS

The student will:

- 1.1 Implement the safety and sanitation procedures established by state law. **
- 1.2 Comply with the Department of Health Rules and the Tennessee Board of Cosmetology Rules and Regulations. **
- 1.3 Distinguish the difference between safe and dangerous experimentation. ***

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

- 1.1.A Establishes and maintains a working environment incorporating safety rules and regulations of the Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), and the Tennessee Board of Cosmetology.
- 1.1.B Evaluates Material Safety Data Sheets (MSDS) for preventive measures to use in dealing with chemicals and treatment procedures.
- 1.1.C Develops and practices acceptable procedures to prevent cross-contamination, airborne illnesses, and blood-borne pathogens.
- 1.2.A Distinguishes and employs preventive measures for ecological, chemical, and physical contamination.
- 1.2.B Incorporates safety and sanitation terminology into conversations during the class period.
- 1.3 Evaluates the “cause” and “effect” relationship and its importance.

SAMPLE PERFORMANCE TASK

- Conduct a sanitation self-inspection and determine modifications necessary for compliance with Rules, Regulations, and Standards of the Tennessee State Board of Cosmetology Law.
- Develop an integrated project with health and chemistry classes to create treatment charts using information from Material Safety Data Sheets (MSDS).
- Incorporate professional cosmetology terms into language.
- Participate in a reward system for the use of professional terminology in the class.
- Conduct experiments and record results concerning contamination of chemicals.
- Participate in the Occupational Safety and Health competition in Tennessee SkillsUSA-VICA.

INTEGRATION LINKAGES

Lifetime Wellness, Industrial Chemistry, Chemistry, United States Department of Labor, Health, Biology, Secretary's Commission on Achieving Necessary Skills (SCANS),

State Board of Education Approved

July 2001

Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), Tennessee Occupational Safety and Health Administration (TOSHA), Technical Report Writing Skills, Communication Skills, Math Skills, SkillsUSA-VICA, and Tennessee State Board of Cosmetology Law

CHEMISTRY OF COSMETOLOGY

STANDARD 2.0

Students will analyze procedures for cleansing and reconditioning the hair and the scalp.

LEARNING EXPECTATIONS

The student will:

- 2.1 Evaluate the chemistry of water and its relationship to cleansing agents and conditioners. **
- 2.2 Differentiate between the chemical make-up of soaps, detergents, and surfactants. **
- 2.3 Research and compare basic types of surfactants. **

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

- 2.1.A Selects shampoos and conditioners based on water chemistry in the area.
- 2.1.B Analyzes the effects of hard and soft water in relation to shampoos and conditioners.
- 2.1.C Evaluates the shampoo molecule and its purpose.
- 2.2 Compares the pH (potential hydrogen) of soaps, detergents, and surfactants.
- 2.3 Presents a research paper on effects of surfactants.

SAMPLE PERFORMANCE TASKS

- Assess the pH (potential hydrogen) of various over-the-counter hair-care products. Compare them with products available from professional suppliers.
- Experiment with making shampoos and conditioners.
- Choose the correct styling products for a client.
- Develop an integrated project with the chemistry class to research and write a report on the chemistry of a product. Research should include reasons the product is successful based on its chemical formulation. Create an electronic presentation using data collected in the research and present the findings to school, community, and professional groups.
- Enter the Job Skill Demonstration A competition with Tennessee SkillsUSA-VICA.

INTEGRATION LINKAGES

Chemistry, Science, Communication Skills, Teamwork Skills, Language Arts, Research and Writing Skills, Computer Technology Skills, Internet Navigation Skills, Secretary's Commission on Achieving Necessary Skills (SCANS), Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), Tennessee Occupational Safety and Health Administration (TOSHA), SkillsUSA-VICA, National Cosmetology Association, Tennessee Hairdressers Association, Cosmetic Chemist Association, Tennessee State Board of Cosmetology

CHEMISTRY OF COSMETOLOGY

STANDARD 3.0

Students will create harmony using design principles and elements.

LEARNING EXPECTATIONS

The student will:

- 3.1 Evaluate the chemical elements involved in the principles of hair design. **
- 3.2 Evaluate chemicals used in the development of styling products. ***
- 3.3 Relate styling and finishing results to the chemicals used. **

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

- 3.1.A Distinguishes between chemical elements used in physical and chemical styling.
- 3.1.B Diagrams the chemical bonds in the hair and shows changes with various chemicals.
- 3.2 Analyzes the ability to mold, shape, and restructure hair based on chemicals used.
- 3.3 Evaluates the effect of styling and finishing products on the hair shaft based on chemical make-up of products used.

SAMPLE PERFORMANCE TASK

- Conduct experiments that will show different chemical and physical effects of shampoos, conditioners, and styling products on various hair types.
- Develop presentations that show chemical changes in the hair when different products are used.
- Discuss why some styling is more durable than others.
- Participate in the science fair.
- Participate in Tennessee SkillsUSA-VICA events and competitions.
- Complete the hairstyling portion of the Tennessee State Board of Cosmetology examination.

INTEGRATION LINKAGES

Math, Chemistry, Wellness, Geometry, Communication Skills, Teamwork Skills, Language Arts, Writing Skills, Secretary's Commission on Achieving Necessary Skills (SCANS), Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), Tennessee Occupational Safety and Health Administration (TOSHA), SkillsUSA-VICA, *Professional Development Program*, SkillsUSA-VICA, Psychology, Sociology, Science, Computer Technology, Computer Skills, Research Skills, National Cosmetology Association, Tennessee Hairdressers Association, Cosmetic Chemists Association, Tennessee State Board of Cosmetology

CHEMISTRY OF COSMETOLOGY

STANDARD 4.0

Students will evaluate hands and feet for cosmetic procedures.

LEARNING EXPECTATIONS

The student will:

- 4.1 Evaluate the structure and chemical make-up of the nail. **
- 4.2 Examine the difference between physical and chemical change. ***
- 4.3 Evaluate the purpose of a catalyst and its effects on the nail. **
- 4.4 Compare solvents and solutes. **
- 4.5 Evaluate the use of adhesives and primers. **

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

- 4.1 Analyzes the structure of the nail.
- 4.2 Demonstrates the ability to create a physical and a chemical change.
- 4.3 Analyzes the nail before and after the use of catalysts.
- 4.4 Evaluates the purpose and use of solvents and solutes.
- 4.5 Demonstrates the use of adhesives and primers.

SAMPLE PERFORMANCE TASK

- Construct a healthy nail using clay.
- Compose a display showing chemical and physical changes in products.
- Demonstrate nail applications, one with the use of a primer and one without the use of a primer. Record the findings.
- Participate in the Nail Care competition in Tennessee SkillsUSA-VICA competition.
- Complete the manicuring portion of the Tennessee State Board Manicuring examination.
- Develop a community project to inform elementary students on the importance of proper care of the hands and feet.

INTEGRATION LINKAGES

Art, Math, Chemistry, Communication Skills, Teamwork Skills, Language Arts, Research and Writing Skills, Computer Skills, Internet Navigation Skills, Secretary's Commission on Achieving Necessary Skills (SCANS), Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), Tennessee Occupational Safety and Health Administration (TOSHA), Psychology, Sociology, Science, Computer Technology, SkillsUSA-VICA, National Cosmetology Association, Tennessee Hairdressers Association, Cosmetic Chemists Association, Tennessee State Board of Cosmetology

CHEMISTRY OF COSMETOLOGY

STANDARD 5.0

Students will formulate cosmetic procedures and applications to enhance a client's appearance.

LEARNING EXPECTATIONS

The student will:

- 5.1 Evaluate products based on chemical make-up for use on different types of skin. **
- 5.2 Evaluate products to determine SPF (Sun Protection Factor). **
- 5.3 Evaluate products to determine skin absorption factors. ***
- 5.4 Examine the physical and chemical classifications of cosmetics. ***

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

- 5.1 Selects facial products based on analysis of ingredients.
- 5.2 Examines packaging to determine SPF (Sun Protection Factor) of products.
- 5.3.A Determines the skin absorption factor of various cleansers.
- 5.3.B Determines the skin absorption factor of various moisturizers.
- 5.4 Evaluates the results of cosmetic exposure to determine physical and chemical effects on the skin.

SAMPLE PERFORMANCE TASKS

- Pour small amount of oil into a transparent container followed by a small amount of water; shake the container. Write down observation. Add a small amount of liquid soap and shake. Write down observation. Discuss the fact that when the soap was added a milky white emulsion was created.
- Research the cause, effect, and impact of products and ingredients on the skin. Develop the findings into a Power Point presentation and present to the health and chemistry classes.
- Develop an integration project with economics and manufacturing and research the development and the manufacturing process of cosmetics.
- Visit a cosmetic test salon or a manufacturing plant to examine employment opportunities, study cosmetic manufacturing, and evaluate how ingredients are selected for particular products.
- Complete the facial and makeup application portions of the Tennessee State Board of Cosmetology examination.

INTEGRATION LINKAGES

Math, Chemistry, Manufacturing, Economics, Technical Writing Skills, Communication Skills, Teamwork Skills, Language Arts, Research and Writing Skills, Computer Technology Skills, Internet Navigation Skills, Secretary's Commission on Achieving Necessary Skills (SCANS), Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), Tennessee Occupational Safety and Health Administration (TOSHA), Chemistry, Psychology, Sociology, Science, SkillsUSA-VICA, National Cosmetology Association, Tennessee Hairdressers Association, Cosmetic Chemists Association, Tennessee State Board of Cosmetology

CHEMISTRY OF COSMETOLOGY

STANDARD 6.0

Students will evaluate basic actions of chemicals, as they relate to the cosmetology industry.

LEARNING EXPECTATIONS

The student will:

- 6.1 Differentiate between sulfur, hydrogen, and disulfide bonds in the hair. ***
- 6.2 Evaluate the chemical classifications of hair coloring and hair lighteners. **
- 6.3 Evaluate color effects on melanin. **
- 6.4 Evaluate the chemical classifications of permanent waves. ***

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

- 6.1.A Examines the effects of water on shape memory and chemical bonds in the hair.
- 6.1.B Examines the effect of chemicals on shape memory.
- 6.1.C Assesses the possibility of hair breakage during chemical treatments and develops methods to prevent breakage.
- 6.1.D Evaluates the effects of chemicals used for re-texturing by applying permanent wave solution, chemical relaxers, and hair coloring to hair.
- 6.2.A Assesses how bonds in the hair are effected when a semi-permanent and/or permanent hair color is applied.
- 6.2.B Assesses how bonds in the hair are effected when a lightener is applied.
- 6.3 Composes a chart to show color effects on melanin.
- 6.4 Evaluates the effects of permanent wave and restructuring solution(s) on the hair.

SAMPLE PERFORMANCE TASK

- Evaluate results of chemical services and record on electronic client data form.
- Experiment with various color products and different hair textures and colors. Electronically record the results.
- Experiment with chemicals to determine the effect on melanin. Electronically record hair color, texture, and porosity change.
- Brainstorm the possible reasons for failure in permanent hair restructuring.
- Complete the chemical portion of the Tennessee State Board of Cosmetology examination.

INTEGRATION LINKAGES

Math, Communication Skills, Teamwork Skills, Language Arts, Research and Writing Skills, Secretary's Commission on Achieving Necessary Skills (SCANS), Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), Tennessee Occupational Safety and Health Administration (TOSHA), Psychology, Sociology, Science, Chemistry, Computer Technology, Research and Experimentation

Techniques, SkillsUSA-VICA, National Cosmetology Association, Tennessee Hairdressers Association, Tennessee State Board of Cosmetology

CHEMISTRY OF COSMETOLOGY

STANDARD 7.0

Students will demonstrate leadership, citizenship, and teamwork skills required for success in the school, community, and workplace.

LEARNING EXPECTATIONS

The student will:

- 7.1 Demonstrates dignity in work. **
- 7.2 Participate in SkillsUSA-VICA as an integral part of classroom instruction. **
- 7.3 Evaluate school, community, and workplace situations by applying problem-solving and decision-making skills. **
- 7.4 Demonstrate the ability to work professionally with others. **

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

- 7.1.A Demonstrates attitudes conducive to success, through exhibiting characteristics of honesty, integrity, flexibility, adaptability, patience, objectivity, tolerance, perseverance, and initiative.
- 7.1.B Researches the Internet for continuing education in the cosmetology industry.
- 7.2.A Compares the relationship between work ethics and personal job success.
- 7.2.B Presents information valuable to consumers to school, community, and professional groups.
- 7.3 Analyzes situations in the workplace and uses problem-solving techniques to solve and create a desirable environment.
- 7.4.A Participates in job shadowing in an area of cosmetology.
- 7.4.B Manages an officer or national voting delegate campaign with Tennessee SkillsUSA-VICA.

SAMPLE PERFORMANCE TASKS

- Prepare a resume.
- Develop a plan for continuing education in the cosmetology industry.
- Create a chart showing personal goals for future growth in the cosmetology industry.
- Participate in various SkillsUSA-VICA programs and/or competitive events.
- Attend a professional organization meeting such as, Chamber of Commerce meeting or Tennessee Cosmetology Association.
- Participate in the American Spirit Award competition with SkillsUSA-VICA.
- Develop a plan of action for an officer candidate or national voting delegate.
- Participate in job shadowing or internship within the cosmetology industry.

INTEGRATION LINKAGES

SkillsUSA-VICA, *Professional Development Program*, SkillsUSA-VICA, Communications and Writing Skills, Teambuilding Skills, Research, Language Arts, Sociology, Psychology, Math, Math for Technology, Applied Communications, Social Studies, Problem Solving, Interpersonal Skills, Employability Skills, Critical-Thinking Skills, Secretary's Commission on Achieving Necessary Skills (SCANS), Chamber of Commerce, Colleges, Universities, Technology Centers, and Employment Agencies, National Cosmetology Association, Tennessee Hairdressers Association, Tennessee Cosmetology Association, Tennessee State Board of Cosmetology